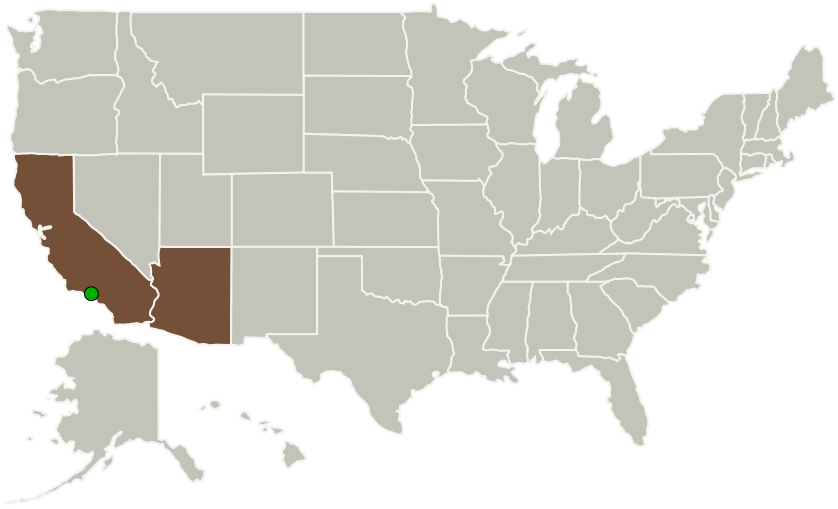
High-Speed, Low-Power ADC for Digital Beam Forming (DBF) Systems, Phase I

Completed Technology Project (2010 - 2010)

Project Introduction

Ridgetop Group will design a high-speed, low-power silicon germanium (SiGe)-based, analog-to-digital converter (ADC) to be a key element for digital beam forming (DBF) systems that are used in NASA's future radar missions. The ADC will employ a novel combination of time interleaving, high-speed bipolar technology and low-power techniques, such as the double-sampling technique, providing exceptional sampling speed of 500 MSPS,12 bits of resolution and very low, 100mW power dissipation. Ordinarily, ADC design requires large trade-offs in speed, resolution, and power consumption. The significance of this innovation is that it simultaneously provides a high-speed, high-resolution, and low-power ADC that is well ahead of the state-of-the-art. These three characteristics are needed for DBF systems that contain large ADC arrays. The power consumption of existing ADC chips prohibits implementation of large DBF arrays in space. Ridgetop's innovative design leverages newer semiconductor process technologies that combine silicon and germanium into a compound semiconductor.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Ridgetop Group, Inc.	Lead Organization	Industry Women-Owned Small Business (WOSB)	Tucson, Arizona
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations	
Arizona	California

Project Transitions

January 2010: Project Start

July 2010: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139993)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Ridgetop Group, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

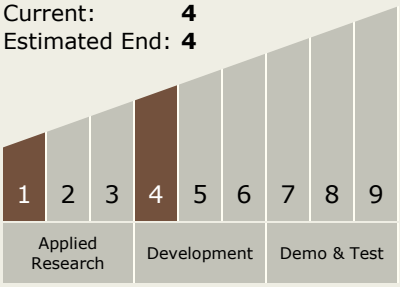
Carlos Torrez

Principal Investigator:

Justin Judkins

Technology Maturity (TRL)

Start: **1**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.2 Electronics

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System